

Custom Bracket for Mounting a Commercial Fish Feeder onto Covered Circular Tanks

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Abstract: Automatic feeders are routinely used during fish rearing to decrease labor, increase feed utilization, and maximize fish growth. Because of the variety of feeders, the diversity of rearing tanks, and use of other infrastructure like tank covers, customization is frequently required for mounting the feeder to the rearing tank. This manuscript describes an innovative and durable bracket for mounting feeders onto near-totally covered circular fish-rearing tanks. The mount design consists of reinforced aluminum framing attached to a hinged hanger to secure the feeder to the edge of the tank. These mounting brackets have been used successfully for over a year on multiple tanks at a production fish hatchery without any issues.

Keywords: fish feeder, mounting bracket, circular tank

1. INTRODUCTION

Delivering feed is a critical component of rearing fish. Both manual (hand) or mechanical (automatic) feeding methods are often used. Hand feeding provides fish hatchery staff the opportunity to observe feed consumption, assess fish health, and note other conditions within each rearing unit during feeding [1-4]. However, hand feeding is inefficient and expensive because of labor requirements [1, 3]. In contrast, automatic feeders have lower labor requirements, but also have a larger upfront cost [1, 5, 6]. Most importantly, automatic feeders have the capability to improve growth and efficiency by dispensing uniform amounts of feed multiple times a day [1,3,7].

Electrically-powered automatic feeders are widely in aquaculture. These feeders typically store feed in some kind of hopper, with the feed dispensed into the rearing unit when an electrical motor is activated [8]. Using electric feeders greatly reduces labor costs compared to hand-feeding [7,9,10]. In addition, their use has been shown to improve feed conversion ratios, feed utilization efficiencies and water quality [1,11-14].

Multiple types of automatic electrical feeders are available commercially, but because of the variety of sizes, styles, and types of fish rearing units, mounting brackets are frequently custom-made [15-17]. In addition to the variety of rearing units, covering tanks to improve fish rearing performance creates special challenges for mounting feeders [18-25]. With tank covers, electric automatic feeders must be mounted to the side of the tank. This paper describes an innovative, inexpensive, and durable structure for mounting an electrically-powered automatic fish feeder on the side of a covered circular fish rearing tank.

2. DESIGN

The feeder mounts were designed, fabricated, and evaluated at McNenny State Fish Hatchery, Spearfish, South Dakota USA. Each mount held one Arvo-Tec T Drum 2000 Feeder (Huutokoski, Finland) on a 1.8-m diameter circular fiberglass rearing tank (Figure 1). There was a 44-mm lip around the top of each tank. McNenny Hatchery uses 35 of these tanks for fish rearing.

Mounts were constructed using grade 6061 aluminum. A 49-mm long piece of square aluminum tubing (15-mm wide, 1.25-mm thick) was welded at a 90° angle to a 180-mm long piece of the same size tubing to create an L shape (Figure 2).



Figure 1. Image of an automatic feeder mount for a 1.8-m diameter circular rearing tank in use during hatchery operations.

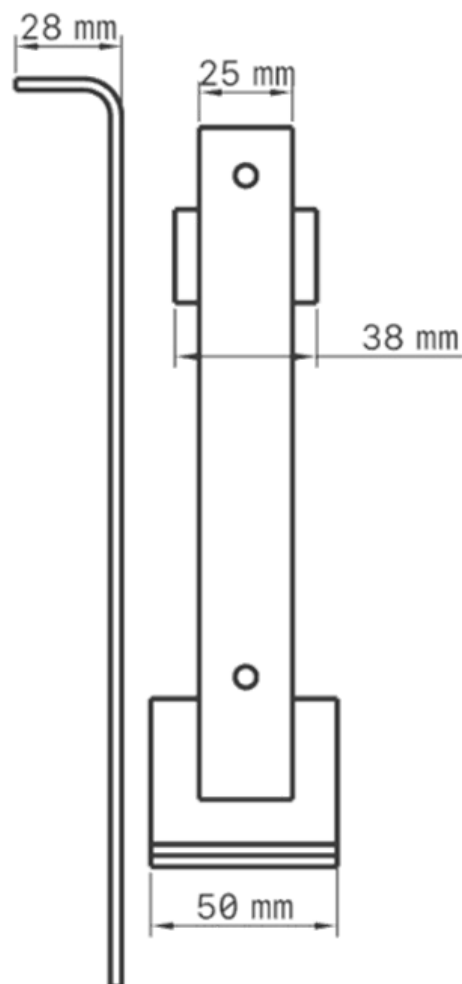


Figure 2. Drawing with measurements of the side view of an automatic feeder mount for a 1.8-m diameter circular rearing unit.

Another L-shaped piece was created by welding two 44-mm long pieces of 50-mm wide aluminum angle. This piece was welded onto the L-shaped aluminum tubing at a 90° angle so that the feeder

mount could slide onto the lip on top of the rearing tank. A small piece of aluminum angle was welded near the top of the upright square tubing to create a handle for ease in installing or removing the bracket and feeder from the tank (Figure 3). To prevent the bracket and attached feeder from easily falling off of the lip of the tank, aluminum flat stock (15 mm wide, 285 mm long) was inserted into the square tubing (Figure 4). A 28-mm tab at the top of the flat stock, created by bending, served two purposes. It kept the flat stock from falling all the way through the square tubing and also served as a handle to remove the flat stock when the feeder and mount were removed from the tank.

Two 71-mm holes were drilled approximately 32-mm from the top of and bottom of the vertical piece of square tubing on the feeder mount. Using two 70-mm bolts and nuts, the square tubing was then attached to the factory-produced Arvo-Tec TD 2000 Hinged Hanger. The feeder mount, with the hinged hanger was attached to the lip of the tank, allowing the feeder to be suspended over the side of the tank in the only uncovered portion (Figure 5). This mount allowed for easy installation and removal of the feeder, as well as for ease in filling the feeder hopper.

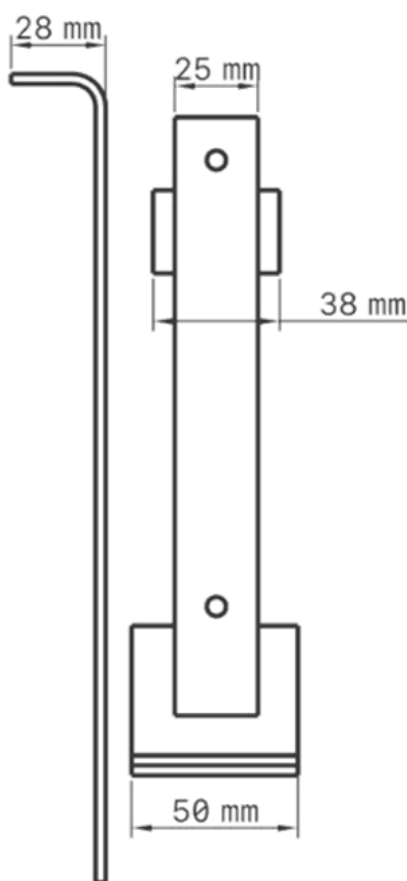


Figure 3. Drawing with measurements of the front view of an automatic feeder mount for a 1.8-m diameter circular rearing unit.

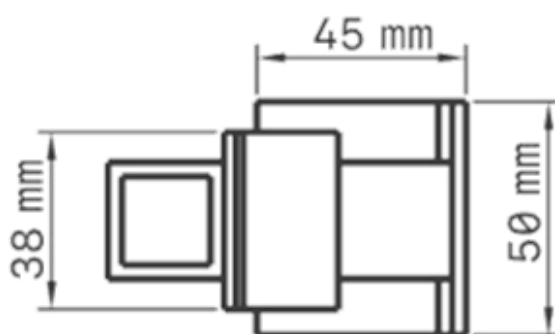


Figure 4. Drawing with measurements of the top view of an automatic feeder mount for a 1.8-m diameter circular rearing unit



Figure 5. Image of the back view of an automatic feeder mount for a 1.8-m diameter circular rearing tank.

3. EVALUATION

The mounts described in this paper have been used for over a year at McNenny Hatchery during actual fish production in up to 35, 1.8-m diameter circular tanks. No breakage or problems have been observed. In addition, the feeders and mounts have been easy to remove when fish are moved out of the rearing units and re-installed when fish have been re-introduced. Daily filling of the feeder hoppers has also be non-problematic. These feeder mounts have proven dependable and easy to use. They are also relatively inexpensive and relatively easy to fabricate

4. CONCLUSION

The custom feeder mounts are a low cost and effective option for automatic electric feeder use in covered circular fiberglass rearing tanks. Use of these mounts are essential to realize the increase in fish rearing efficiencies and decreased labor costs during fish rearing associated with the use of automatic feeders.

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